LISTING OF CLAIMS

Claims

1. (Original) A gear-clutch assembly organized about an axis and comprising:

a gear having grooves that open inwardly toward the axis and extend axially;

a hub located within the gear where it is capable of rotating within the gear, the hub having grooves that open outwardly away from the axis and extend axially;

keys located within the grooves of the hub and being capable of moving radially toward and away from the axis, the arrangement being such that when the keys are permitted to move away from the axis, at least one will enter one of the grooves in the gear to couple the gear and hub so that they will rotate in unison;

wherein the number of keys is evenly divisible by the difference in the number of grooves between the hub and the gear; and

an actuator for effecting radial displacement of the keys.

2. (Original) An assembly according to claim 1 and further comprising springs for urging the keys outwardly away from the axis; and wherein the actuator when energized moves the keys inwardly toward the axis.

3. (Original) An assembly according to claim 2, wherein the actuator comprises:

an electric coil axially fixed about the keys;

a plunge ring capable of moving axially about the keys;

wherein the electric coil when energized moves the plunge ring axially toward the electric coil so that the plunge ring pushes against ramp surfaces of the keys, thereby moving the keys inwardly toward the axis; and

wherein the springs when the electric coil is de-energized urge the keys outwardly from the axis so that the ramp surfaces of the keys push against the plunge ring to move the plunge ring axially away from the electric coil.

4. (Original) An assembly according to claim 1, further comprising means for absorbing torsion impact loads.

5. (Original) An assembly according to claim 4, wherein the means for absorbing torsion impact loads comprises:

an internally splined ring located within the hub having a ramped face and having splines engaged with a supporting shaft so that the internally splined ring is rotationally fixed to the supporting shaft;

an externally splined ring located within the hub having a ramped face engaged with the ramped face of the internally splined ring and having splines engaged with the hub so that the externally splined ring is rotationally fixed to the hub and moves axially within the hub;

a spring located within the hub biasing the externally splined ramp axially against the internally splined ring, wherein rotation of the internally splined ring relative to the externally splined ring compresses the spring.

6. (Original) A method of operating a gear-clutch assembly organized about an axis, comprising the steps of:

providing a gear having grooves that open inwardly toward the axis and extend axially;

providing a hub within the gear where it is capable of rotating within the gear, the hub having grooves that open outwardly away from the axis and extend axially;

providing keys within the grooves of the hub, the keys being capable of moving radially toward and away from the axis, the arrangement being such that when the keys are permitted to move away from the axis, at least one will enter one of the grooves in the gear to couple the gear and hub so that they will rotate in unison;

wherein the number of keys is evenly divisible by the difference in the number of grooves between the hub and the gear; and

providing an actuator for effecting radial displacement of the keys;

energizing the actuator to uncouple the keys with the gear; and

de-energizing the actuator to couple the keys from the gear.

7. (Original) The method of claim 6 further comprising the steps of providing a means for absorbing torsion impact loads.

8. (Original) The method of claim 7 wherein the means for absorbing torsion impact loads comprises:

an internally splined ring located within the hub having a ramped face and having splines engaged with a supporting shaft so that the internally splined ring is rotationally fixed to the supporting shaft;

an externally splined ring located within the hub having a ramped face engaged with the ramped face of the internally splined ring and having splines engaged with the hub so that the externally splined ring is rotationally fixed to the hub and moves axially within the hub;

a spring located within the hub biasing the externally splined ramp axially against the internally splined ring, wherein rotation of the internally splined ring relative to the externally splined ring compresses the spring.